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Patentanmeldung Nr.	**Patent application No.**	**Demande de brevet n°**

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The organization code and number of your priority application, to be used for filing abroad under the Paris Convention, is EP01119537.

Der Präsident des Europäischen Patentamts;
Im Auftrag

For the President of the European Patent Office

Le President de l'Office européen des brevets
p.o.

R.C. van Dijk

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(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se référer à la description.)

Method and receiver for decoding a signal sent over a bandwidth-expanding channel

In Anspruch genommene Priorität(en) / Priority(Priorities) claimed / Priorité(s) revendiquée(s)
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Claims

1. Method for decoding a signal sent over a bandwidth-expanding channel, comprising the step of sampling a continuous band in the frequency domain of the received signal with a sampling frequency lower than the frequency given by the Shannon theorem, but greater than or equal to the innovation rate of the signal sent.

2. Method according to claim 1, wherein said continuous band is bandpass.

3. Method according to claim 2, wherein said continuous band is the band of predetermined bandwidth with the highest signal power.

4. Method according to claim 2, wherein said continuous band is the band of predetermined bandwidth with the highest signal over noise ratio.

5. Method according to claim 2, wherein said signal is a CDMA signal.

6. Method according to claim 5, wherein the sample rate is higher than the symbol rate but lower than the chip rate.

7. Method according to claim 6, wherein the sample rate depends on the signal over noise ratio.

8. Method according to claim 2, wherein said signal is an ultra wide band signal.

9. Method according to claim 7, comprising the following steps:
filter the received signal with a sinc filter ($Bsinc(Bt)exp(j\omega_c t)$),
take K samples y_n of the filtered signal,
calculate the spectra of the samples Y[k],
deconvolve the signal to obtain Z[k] = Y[k]/S[k], wherein S[k] is the

spectra of the signature s(t),

calculate the locations and/or amplitudes of a Dirac stream corresponding to the sent signal from Z[k].

10. Method for decoding a signal sent over a bandwidth-expanding channel, comprising the following steps:

taking K samples y_n of the received signal

calculating the spectra Y[k] over a frequency band [A,B],

computing a covariance matrix from said samples Y[k],

making at least one single value decomposition of the covariance matrix to retrieve the information on the symbols sent.

11. Method according to claim 10, wherein said information is retrieved using a step of keeping the largest values of the covariance matrix.

12. Method according to claim 10, further comprising an equalization step to invert the effect the pulse shape, channel and front-end imperfections.

13. Receiver using the method of one of the preceding claims.